the lowest, 11°, at Temperance on the 4th. The average precipitation was 2.05, or 1.43 below normal; the greatest monthly amount, 4.18, occurred at Longshore, and the least, 0.36, at Blackville.

There were a number of ground freezes over the central and western portions that winter-killed some oats. Plowing and other preparations for spring planting and gardening progressed rapidly over the eastern, and slowly over the western counties. The oat and wheat crops are in poor condition, but reseeding is being done to a large extent.—*J. W. Bauer.*

South Dakota.—The mean temperature was 20.1°, or 4.0° above normal; the highest was 65°, at Rapid City on the 7th and at Fort Meade on the 8th, and the lowest, 32° below zero, at Elk Point on the 27th. The average precipitation was 0.33, or 0.22 below normal; the greatest monthly amount, 1.53, occurred at Fort Meade, and the least, trace, at Cherry Creek and Mound City.

Almost continuous fair weather prevailed during the first and second decades, with generally moderate temperature for the season. Live stock subsisted largely on the ground-cured range grasses, resulting in considerable economy of garnered and stacked feed. The weather during the third decade was cold, with the temperature much of the time near or below zero, and snow at intervals, necessitating some feeding of stock on farms and on ranges of limited area. From some western localities a slight loss of young, unacclimated cattle is reported, due to the low temperature. An unusual feature of the cold weather was the occurrence in the extreme southeastern county of the minimum temperature of the month for the State.—*S. W. Glenn.*

Tennessee.—The mean temperature was 36.9°, or 1.3° below normal; the highest was 73°, at Ashwood on the 1st and at Hohenwald on the 27th, and the lowest, 2°, at Silver Lake on the 14th. The average precipitation was 5.14, or 0.13 above normal; the greatest monthly amount, 7.83, occurred at Covington, and the least, 2.77, at Bristol.

Alternate freezing and thawing, following mild weather, with no snow protection, caused very bad condition in winter grains, and at the end of the month prospects were poorer than for many years. Early sown and drilled grain are better than late sowings; much of the latter appears dead, and considerable of the area devoted to this portion of the crop will be plowed up and planted in corn. Winter oats seem to be mostly killed.—*H. C. Bate.*

Texas.—The mean temperature was 46.4°, or 0.7° below normal; the the highest was 91°, at Trinity on the 4th, and the lowest, 4° below zero, at Amarillo on the 26th. The average precipitation was 0.89, or 1.60 below normal; the greatest monthly amount, 2.95, occurred at Texarkana, while none fell at Kopperl.

The month was highly favorable for outdoor work and farming operations progressed with but few interruptions. Along the northeastern border of the State and over portions of the Gulf coast sufficient rainfall was received for the growth of crops, but over the larger part of the State the need of moisture continues to be felt. The growth of winter wheat was checked by the unfavorable weather conditions and poor stands were general. The oat crop was seriously affected and there was little of this crop that showed life. Truck crops, and especially strawberries, were exceptionally well advanced and suffered little from the cold wave that prevailed during the last decade of the month.—*Edward H. Bowie.*

Utah.—The mean temperature was 26.5°, or 0.8° above normal; the highest was 74°, at Fillmore on the 8th, and the lowest, 38° below zero, at Woodruff on the 26th. The average precipitation was 0.71, or 0.33 below normal; the greatest monthly amount, 2.41, occurred at Ranch, and the least, trace, at Giles and Terrace.

In many localities fall grain had no covering of snow when the low temperatures of the latter part of the month occurred, and in some cases the crop has been slightly damaged. The snow has improved conditions on the ranges and all kinds of stock are generally doing well.—*L. H. Murdoch.*

Virginia.—The mean temperature was 34.5°, or 2.5° below normal; the highest was 69°, at Petersburg on the 11th, and the lowest, 3°, at Stanardsville on the 31st. The average precipitation was 2.88, or 0.30 below normal; the greatest monthly amount, 4.78, occurred at Bigstone Gap, and the least, 1.72, at Bedford City.

The month was a most unfavorable one for all winter crops, the weather being cold and dry, and there being no adequate snow protection. Freezing and thawing in the fields were frequent, heaving the young sprouts of wheat, oats, and clover out of the ground, and causing winter-killing. Early and late seeding suffered, especially the latter.—*Edward A. Evans.*

Washington.—The mean temperature was 32.7°, or 1.0° below normal; the highest was 68°, at Mottingers Ranch on the 7th, and the lowest, 22° below zero, at Northport on the 27th. The average precipitation was 3.55, or 1.05 below normal; the greatest monthly amount, 9.95, occurred at Clearwater, and the least, 0.42, at Moxee.

The mild weather of the first three weeks was favorable to growth. A heavy snowstorm on the 24th covered wheat fields with snow, but many fields were blown bare by violent winds, and wheat was probably frozen out by the severe weather that ensued.—*G. N. Salisbury.*

West Virginia.—The mean temperature was 30.2°, or 1.8° below normal; the highest was 64°, at Williamson on the 9th, and the lowest, 1° below zero, at Parsons and Terra Alta on the 5th. The average precipitation was 3.65, or 0.45 above normal; the greatest monthly amount, 8.52, occurred at Lewisburg, and the least, 1.45, at Moscow.

Alternate freezing and thawing, with practically no snow protection, were very unfavorable for wheat, which was already in a weak condition from the fall drought, and it is feared considerable has been winter-killed; practically no plowing for corn or farm work of any kind has been done on account of frozen ground. The sleet storm of the 29th and 30th was reported to have been the worst in a number of years (some say since 1856) and considerable damage was done, especially to fruit trees, by breaking off limbs. The sleet was very heavy, in some cases being three-quarters of an inch thick.—*E. C. Vose.*

Wisconsin.—The mean temperature was 18.6°, or 4.2° above normal; the highest was 56°, at Valley Junction on the 8th, and the lowest, 39° below zero, at Hayward on the 28th. The average precipitation was 0.68, or 0.74 below normal; the greatest monthly amount, 1.95, occurred at Ladysmith, and the least, 0.07, at Port Washington.

Winter crops were generally well protected throughout the month, although during the second decade much of the ground in the southeastern counties was bare. From the 20th to the 26th snow occurred at intervals, so that the ground was well covered before the cold wave of the 28th.—*W. M. Wilson.*

Wyoming.—The mean temperature was 20.7°, or 1.4° below normal; the highest was 65°, at Fort Laramie on the 8th, and the lowest, 41° below zero, at Griggs on the 26th. The average precipitation was 0.26, or 0.36 below normal; the greatest monthly amount, 0.96, occurred at Fort Yellowstone, and the least, trace, at Buffalo, Burlington, Laramie, Lovell, and South Pass City.

Unusually mild and pleasant weather was general over the State during the first two decades of the month. A severe cold wave overspread the State after the 22d, culminating on the 26th in the severest cold wave of the winter. The snowfall for the month was light, and the supply of snow in mountains was not materially increased. Stock suffered some during the cold wave, but no losses were reported.—*W. S. Palmer.*

SPECIAL CONTRIBUTIONS.

HAWAIIAN CLIMATOLOGICAL DATA.

By CURTIS J. LYONS, Territorial Meteorologist.

GENERAL SUMMARY FOR JANUARY, 1902.

Temperature mean for the month, 70.8°; normal, 70.1°; average daily maximum, 76.5°; average daily minimum, 65.6°; average daily range, 10.9°; greatest daily range, 20.5°; least daily range, 5°; highest temperature, 78°; lowest, 55.5°.

Barometer average, 29.995; normal, 29.950 (corrected for gravity by —.06); highest, 30.17, on the 1st; lowest 29.79, on the 24th; greatest 24-hour change, i. e., from any given hour on one day to the same hour on the next, 0.13. Lows passed this point on the 9th and 24th; highs on the 1st and 16th.

Relative humidity, 72 per cent; normal, 76.7; mean dew-point, 60.7°; normal, 62.8°; absolute moisture, 5.89 grains to the cubic foot; normal, 6.27. Lowest dew-point, 10th and 26th.

Rainfall, 0.30 inch; normal, 3.10; rain record days, 15; normal, 16; greatest rainfall in one day, .06, on the 25th; total at Luakaha, 4.20; normal, 9.15; at Kapiolani Park, 0.13; normal, 2.00.

The artesian well level fell during the month from 34.05 to 33.95 feet above mean sea level. February 1, 1901, it stood at 34.03. The average daily mean sea level for January was 9.90 feet on the scale, 10.00 representing an assumed annual mean, and 9.86 the actual mean for ten years. There is evidently no reason for fear that the island is subsiding.

Trade wind days, 23 (4 of northeast); normal 14; average force (during daylight) Beaufort scale, 2.5. Cloudiness, tenths of sky, 3.7.

Approximate percentages of district rainfall: South Hilo, 28; North Hilo, 60; Hamakua, 50; Kohala, 60; Waimea, 68; Kona, 86; Kau, 25; Puna, 35; Maui, 50; leeward Oahu, 8; windward, Oahu, 40; Kauai, 28.

Mean temperatures: Pepeekeo, Hilo district, 100 feet elevation, average maximum, 76.7°; average minimum, 65.9°; Waimea, Hawaii, 2,730 elevation, 69.9° and 60.2°; Kohala, 521 elevation, 74.6° and 64.7°; Waiakoa, Kula, Maui, 2,700 elevation, 73.7° and 53.0°; Kulaokahua, W. R. Castle, 60 feet elevation, highest, 79°; lowest, 57°; mean, 70.3°.

Mr. Fleming, United States Coast and Geodetic Survey, magnetic observatory near Sisal, Ewa, Oahu, 50 feet elevation, furnishes the following figures: Rainfall, 0.09; mean maximum, 80.9°; mean minimum, 61.3° (probable mean temperature, 70.4°); dew-point at 9 a. m., 61.8°; 9 p. m., 60.7°; mean relative humidity, 76.

Kohala, Dr. B. D. Bond reports mean dew-point, 62.1°; relative humidity, 78.

The month of January was characterized by fine weather, the only noteworthy feature being the cold wave from the 24th to 27th.

Rainfall data.

Stations.	Elevation.	Jan., 1902.
HAWAII.		
HILO, e. and ne.	*Feet.*	*Inches.*
Waiakea	50	2.63
Hilo (town)	100	.....
Kaumana	1,250	4.39
Pepeekeo	100	3.25
Hakalau	200	5.08
Honohina	300	7.47
Laupahoehoe	500	5.08
Ookala	400	.....
HAMAKUA, ne.		
Kukaiau	250	3.29
Paauilo	750	.....
Paauhau (Mill)	300	2.49
Paauhau (Greig)	1,150	.....
Honokaa (Muir)	425	3.34
Honokaa (Rickard)	1,900	.....
Kukuihaele	700	4.22
KOHALA, n.		
Awini Ranch	1,100	.....
Niulii	200	3.02
Kohala (Mission)	521	2.75
Kohala (Sugar Co.)	235	3.83
Hawi	300	.....
Hawi Mill	600	.....
Waimea, c	2,720	2.64
KONA, w.		
Kailua	950	2.23
Holualoa	1,350	2.67
Kealakekua	1,580	3.47
Napoopoo	25	1.51
KAU, se.		
Kahuku Ranch	1,680	2.29
Waiohinu	1,000	2.43
Honuapo	15	0.16
Naalehu	650	0.89
Hilea	310	1.20
Pahala	850	.....
Moaula	1,700	.....
PUNA, e.		
Volcano House	4,000	4.78
Olaa	.....	.....
Olaa (17-mile)	1,700	4.15
Kapoho	110	.....
Kalapana, se.	.....	.....
MAUI.		
Lahaina, w	.....	.....
Waiopae Ranch, s	700	0.07
Kaupo (Mokulau), s	285	2.13
Kipahulu, s	300	.....
Kahikinui	1,550	.....
Hamoa Plantation, se	60	4.29
Nahiku (Anderson), ne	60	8.46
Nahiku (Nishwitz), ne)	800	2.36
Haiku, n	700	3.07
MAUI—*Continued.*	*Feet.*	*Inches.*
Kula (Waiakoa)	2,700	0.85
Kula (Erehwon), n	4,500	.....
Puuomalei, n	1,400	2.19
Paia, n	180	1.33
Haleakala Ranch, n	2,000	2.18
Wailuku, ne	200	1.50
LANAI.		
Keomuku, e	6	.....
OAHU.		
Punahou (W. B.), sw	47	0.30
Kulaokahua, sw	50	0.15
Makiki Reservoir	150	0.11
Kewalo (King street), sw	15	.....
U. S. Naval Station, sw	6	0.34
Kapiolani Park, sw	10	0.13
Manoa (Woodlawn Dairy), e.	285	1.30
School street (Bishop), sw	50	0.33
Pacific Heights, sw	700	0.60
Insane Asylum, sw	30	0.14
Kamehameha School	75	0.13
Kalihi-Uka, sw	260	1.42
Nuuanu (W. W. Hall), sw	50	0.29
Nuuanu (Wyllie street), sw.	250	.....
Nuuanu (Elec. Station), sw.	405	0.63
Nuuanu (Luakaha), e	850	4.20
Waimanalo, ne	25	0.74
Maunawili, ne	300	1.58
Kaneohe, ne	100	.....
Ahuimanu, ne	350	2.56
Kahuku, n	25	0.55
Waialua, n	20	0.01
Wahiawa, c	900	0.60
Ewa Plantation, s	60	.....
Waipahu, s	200	0.00
Moanalua, sw	15	0.19
KAUAI.		
Lihue (Grove Farm), e	200	1.02
Lihue (Molokoa), e	300	0.95
Lihue (Kukaua), e	1,000	1.71
Kealia, e	15	0.00
Kilauea, ne	325	1.48
Hanalei, n	10	2.19
Haena	15	1.25
Waiawa, sw	32	0.78
Eleele, s	200	0.40
Wahiawa Mountain, s	2,100	3.25
McBryde (Residence)	850	1.29
Lawai	450	1.04
Delayed December reports.		
Kailua	.....	5.17
Waiakoa	.....	4.56
Puuomalei	.....	11.43

OBSERVATIONS AT HONOLULU.

The station is at 21° 18′ N., 157° 50′ W.

Hawaiian standard time is 10h 30m slow of Greenwich time. Honolulu local mean time is 10h 31m slow of Greenwich.

Pressure is corrected for temperature and reduced to sea level, and the gravity correction, —0.06 has been applied.

The average direction and force of the wind and the average cloudiness for the whole day are given unless they have varied more than usual, in which case the extremes are given. The scale of wind force is 0 to 12, or Beaufort scale. Two directions of wind, or values of wind force, or amounts of cloudiness, connected by a dash, indicate change from one to the other.

The rainfall for twenty-four hours is measured at 9 a. m. local, or 7.31 p. m., Greenwich time, on the respective dates.

The rain gage, 8 inches in diameter, is 1 foot above ground. Thermometer, 9 feet above ground. Ground is 43 feet, and the barometer 50 feet above sea level.

Meteorological Observations at Honolulu, January, 1902.

Date.	Pressure at sea level.	Temperature.		During twenty-four hours preceding 1 p. m. Greenwich time, or 1:30 a. m. Honolulu time.							Sea-level pressures.		Total rainfall at 9 a. m., local time.
				Temperature.		Means.		Wind.		Average cloudiness.			
		Dry bulb.	Wet bulb.	Maximum.	Minimum.	Dew-point.	Relative humidity.	Prevailing direction.	Force.		Maximum.	Minimum.	
	*	†	†			‡	‡		§				
1	30.13	68	58	71	63	53.0	58	nne.	3-4	5	30.17	30.07	0.00
2	30.11	70	62	74	66	55.0	60	nne.	3	6-3	30.16	30.08	0.00
3	30.11	70	64	75	66	60.7	69	ne.	3-4	2-6	30.14	30.08	0.01
4	30.08	71	66	76	67	62.3	72	ne.	3-4	5	30.13	30.01	0.01
5	30.11	73	65	76	69	65.3	78	ne.	3-4	6-4	30.13	30.00	0.01
6	30.07	72	64.5	77	71	62.7	68	ne.	4	4	30.14	30.04	0.00
7	30.02	71	65	76	71	62.3	68	ne.	4	5	30.11	29.98	0.01
8	29.96	66	64	76	70	61.0	67	ne.	3	4-8	30.05	29.92	0.00
9	29.91	67	64	76	64	63.0	79	s-sw.	1-0	8-2	29.99	29.86	0.03
10	29.96	67	58.5	78	66	63.5	80	w.	4-0	6-2	29.96	29.85	0.00
11	30.05	68	62	74	66	54.5	59	n.	3-4	1	30.08	29.98	0.00
12	30.05	70	62	75	67	58.0	64	ne.	3	3	30.09	29.99	0.00
13	30.04	69	63.5	76	68	59.0	66	ne.	3	4	30.11	30.02	0.00
14	30.00	70	65	76	67	61.7	74	nne.	3-1	5	30.07	29.96	0.01
15	30.01	66	65	77	66	62.3	73	ne.	3-0	5-1	30.04	29.94	0.04
16	30.07	72	66	78	63	63.3	75	ne.	3-1	3	30.10	30.01	0.00
17	30.05	72	64	77	70	62.3	69	ne.	3-4	3	30.12	30.02	0.02
18	30.04	70	65	77	69	60.7	66	ne.	4-2	4-1	30.09	29.98	0.00
19	30.04	72	64	77	70	62.0	69	ne.	3	3	30.10	30.00	0.00
20	30.05	72	66	77	72	61.5	66	ene.	4	3	30.10	30.00	0.01
21	30.00	64	62.5	78	70	62.3	70	ene.	4-2	8-3	30.11	30.00	0.00
22	29.95	63	61.7	78	62	63.7	82	ene.	2	4-6	30.03	29.90	0.02
23	29.90	64	62.5	78	62	62.3	77	e-n.	2-4	3-8	29.96	29.85	0.03
24	29.85	64	62	76	63	62.3	81	n-s.	2-0	4	29.95	29.84	0.00
25	29.83	59	56.3	76	64	59.0	78	n-w.	2-0	4-0	29.88	29.79	0.06
26	29.90	56	54.3	75	56	56.3	75	sw-n.	1-0	0-3	29.92	29.81	0.00
27	29.97	58	56.7	76	55.5	55.5	69	sw-ne.	1-0	0-1	29.98	29.87	0.00
28	29.95	60	58.7	76	56	58.0	70	nne.	0-3	0-4	30.00	29.90	0.00
29	29.91	66	63	77	60	61.0	80	e-ne.	2-0	1-6	30.00	29.89	0.01
30	29.93	68	65	77	60	62.3	76	nne.	3	5-1	29.99	29.87	0.02
31	29.96	73	68	78	65	64.0	75	ne.	2-5	4	30.01	29.91	0.01
Sums	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Means.	30.000	67.4	62.5	76.5	65.6	60.7	72	.....	2.5	3.7	30.055	29.949	0.30
Departure.	+.050	.....	.....	.....	.....	—2.1	—4.7	.....	.....	.....	.....	.....	.....

Mean temperature for January, 1902, $(6+2+9)\div 3=70.8$; normal is 70.1. Mean pressure for Januray, 1902, $(9+3)\div 2=29.995$; normal is 29.950.

*This pressure is as recorded at 1 p. m., Greenwich time. †These temperatures are observed at 6 a. m., local, or 4.31 p. m., Greenwich time. ‡These values are the means of $(6+9+2+9)\div 4$. § Beaufort scale.

MEXICAN CLIMATOLOGICAL DATA.

Through the kind cooperation of Señor Manuel E. Pastrana, Director of the Central Meteorologic-Magnetic Observatory, the monthly summaries of Mexican data are now communicated in manuscript, in advance of their publication in the Boletin Mensual. An abstract, translated into English measures, is here given in continuation of the similar tables published in the MONTHLY WEATHER REVIEW since 1896. The barometric means are now reduced to standard gravity.

Mexican data for January, 1902.

Stations.	Altitude.	Mean barometer.	Temperature.			Relative humidity.	Precipitation.	Prevailing direction.	
			Max.	Min.	Mean.			Wind.	Cloud.
	Feet.	*Inch.*	° *F.*	° *F.*	° *F.*	%	*Inch.*		
Chihuahua	4,669	25.20	77.0	32.0	54.3	38	.....	sw.	.....
Guadalajara (Obs. del. Est.)	5,186	24.94	78.3	41.0	60.3	51	.....	nw.	.....
Leon (Guanajuato)	5,906	24.28	75.7	32.7	55.9	53	.....	ne.	.....
Mazatlan	25	29.93	76.6	57.7	69.4	74	T.	nw.	.....
Merida	50	30.05	94.1	48.0	70.7	65	.....	ne.	.....
Mexico (Obs. Cent.)	7,472	23.02	73.0	32.9	53.1	48	.....	ne.	se.
Monterrey (Sem.)	1,626	28.28	89.4	34.2	56.8	72	0.67	w.	.....
Morelia (Seminario)	6,401	23.93	74.1	30.2	55.8	56	.....	ne.	.....
Puebla (Col. Cat.)	7,125	23.31	72.0	37.4	55.6	52	.....	e.	.....
Puebla (Col. d Est.)	7,118	23.33	77.0	29.5	52.9	56	.....	ene.	.....
Queretaro	6,070	24.15	77.0	33.1	56.7	50	.....	e.	.....
Saltillo (Col. S. Juan)	5,399	24.77	75.7	38.3	54.1	63	T.	ne.	.....
S. Isidro (Hac. de Gto)	.....	.....	68.0	51.4	.....	.....	.....	w.	.....
Toluca	8,812	21.93	71.6	22.3	48.2	48	.....	w.	.....
Zapotlan	5,078	25.08	80.1	38.8	61.3	60	.....	sse.	.....